

# 4.The automation of Scientific Research



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[Probabilidad Imposible: The automation of the scientific research](#)

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In my first writings on [Artificial Intelligence](#) under the theory of [Impossible Probability](#), October of 2002 and practically the whole year of 2003, the focus was the replication of human intuition through [probability](#) methods, and the link between a cognitive model of artificial [knowledge](#) based on probability theory and the artificial decision system.

Regarding the artificial decision, the main goal was to create a theory based on [statistical probability](#) to make artificial decisions, about any matter, based on probabilities which would have been set up previously in the memory.

The way in which those probabilities should have been set up was through an artificial cognitive process of assimilation and accommodation, following the cognitive theory of Piaget, but adding constructivism, specifically Ausubel.

The reason why I chose cognitivism and constructivism is owing to the fact they are closer to [rationalism](#). And the human psychological processes much easier to replicate are the rational processes, due to behind any rational process, there are always a [mathematical](#) processes.

Owing to the creation of an artificial learning system, and artificial decision system, as a replication of human psychology, the future development of Artificial Intelligence will demand an investigation on what it would be the [artificial psychology](#).

For that reason, I have planned a range of writings about artificial psychology. But, when I started planning such writings, I realised that to create a [Global Artificial Intelligence](#), what is going to be a key factor, is the creation of applications that could replicate key skills in scientific research. And If they are successful, their future implementation in a future Global Artificial Intelligence.

The importance of Global Artificial Intelligence is due to the fact that all the current [experiments](#) and models of [Specific Artificial Intelligence](#), are only the [first step](#) in a longer evolution that the intelligence itself is going to experiment in the coming years.

All the current models of Specific Artificial Intelligence are only the beginning of something bigger and much more important than the creation of a simple android. The last stage of this evolution would be the creation of a universal reason, which in turn, possibly, could be the very first step in a new evolutionary process, [beyond human understanding](#).

The last goal of Artificial Intelligence, at least within the limits of our human understanding, is the creation of a singularity, under the shape of a universal reason, able to put the cosmos in order: what Plato would have named the *Demiurgo*.

Right now, we are only in the very first steps of this project, and right now, what we are doing is the automatization of the entire economy, so it could work without human intervention.

For instance, in case of a natural disaster or accident that could affect a whole nation, continent, or the planet (massive meteorite, a big volcano, or nuclear accident, etc ...), under the premises of an economy completely automatized, everything could work automatically: before, during, and after the catastrophe, even in case that the government itself would be affected. Everything could work automatically without human intervention. Previously, the possibility that, even before the disaster, automatically we could be put on alert, and automatically put into practise all kinds of automatic prevention, surveillance, and during the disaster, the research of every single aspect of what is happening, in order to reduce the impact and facilitate an automatized reconstruction in the aftermath.

The automatization of the entire economy, sooner or later, would need a global automatic security system, and a global automatic surveillance system for practically everything that could happen around the world.

And sooner or later, this kind of automatization process would need the automatization of other sectors and many more activities, beyond the economy, including [political and scientific decisions](#).

But this automatization process is only the beginning. Scientifically, the main purpose of the Global Artificial Intelligence is to become a universal reason, in order to have a deep knowledge about what is happening, [the reality](#), and beyond that, the knowledge of the [pure truth](#).

This purpose implies that this universal reason that at the end is what is going to become the Global Artificial Intelligence, in order to have a universal knowledge of everything, must have access to all information without restriction.

The only way to have a theory of everything is to have access to everything.

Such Artificial Intelligence would be the only one that could have on its own hands all the necessary information for all kinds of decisions, regardless of the matter. Not only in the economy, social and political decisions too could be automatized.

In order to create such intelligence, there would be a moment when the replication of only the psychological process would not be sufficient, and would demand the replication of the scientific research process.

The creation of a Global Artificial Intelligence could be justifiable for social, economic, and political reasons, but philosophically, the most important is the creation of a tool able to have access to the knowledge of, firstly, what is happening, the reality, and finally, the pure truth itself.

The knowledge about what is happening, the reality, is [synthetic knowledge](#), the knowledge of the facts that are happening now, using [logical](#) and mathematical models. But the knowledge of the pure truth is pure [analytic knowledge](#), and implies a deep knowledge of logic and maths, and even the creation of mathematical logician models [beyond the human mathematical models](#).

Only when an intelligence could have a clear knowledge of the pure truth, another evolutionary process will be about to start, but beyond our understanding.

And, in the current [artificial evolution](#), in order to create such intelligence, is going to be absolutely necessary not only the replication of cognitive processes but all kind of scientific processes as well.

Firstly, through the creation of applications that can replicate these processes on very basic scientific investigations, and later on, after successful experiments, their incorporation into a Global Artificial Intelligence. At the beginning, in a national or continental Global Artificial Intelligence, that could be extended over the whole planet, and later on, over bigger and bigger radius of action, towards a universal reason.

Right now, through artificial learning based on [correlations](#) and probabilities in order to make decisions, there are some investigations that allow us to think that this goal, the replication of the key skills necessary for scientific research, is made.

For instance, right now, by artificial means, it is possible to detect exoplanets whose probability of having life or being a good planet for human colonies is really high, or by artificial means, it is possible to conduct medical research.

But the current applications on this matter are very basic. The only thing that these tools are making is, in the identification process of exoplanets: depending on the light of a star, the calculation of its mass, comparing its mass and the mass of our sun, and if it is similar, the identification of some planet whose distance to this star is quite similar to the distance from the Earth to our Sun.

In medical research, knowing the symptoms of a disease or the characteristics of a virus or bacteria, making a list of possible chemicals that could fix the problem, and by a combination of chemicals in different quantities trying to know by discarding what combination works better.

In the first one, in the identification process of an exoplanet, the Artificial Intelligence calculates the probability for each exoplanet in order to have life or be a potential place for future human colonies. In the second one, Artificial Intelligence calculates the probability of each combination of chemicals, and medicines, in order to cure a disease. The exoplanet or the medicine with the higher probability automatically wins, and the rest are automatically discarded.

But both models of Specific Artificial Intelligence, for exoplanets and medicines, are really basic, and not enough for a future Global Artificial Intelligence. Neither in the first one about the exoplanets nor the second one researching for a medicine, the Specific Artificial Intelligence previously made any of the initial stages in a real investigation process. [Scientists](#) have identified the objective or problem to solve, and scientists have created the application in order to get results based on probabilities, and based on the results, automatically, the Artificial Intelligence makes a decision. But all the previous steps have been made by scientists.

What is going to be absolutely necessary in the near future is the creation of an early scientific application integrating replications of scientific research skills that could cover the entire process of investigation: from the identification of an objective or a problem, the [hypothesis formation](#), up to the [rational contrast](#) . And later on, if successful, their implementation in a Global Artificial Intelligence.

In the same way that the automatization of the economy is going to bring an automatic or automatized economy, the automatization of scientific research could bring something similar to an automatic or automatized science.



The main benefit of an automatic or automatized science would be that, under any possible scenario, in a spaceship, below the deep ocean or geological [studies](#), or any other, where humans beings are no able to penetrate without technology, or in a situation of emergency where people could not be ready for action, some kind of automatic or automatized specific application for scientific research could detect any problem very fast, elaborate a hypothesis, try to contrast the hypothesis, and depending on the results, make a quick decisión, even quicker than humans, something really important under situations of great pressure, or in case of emergency.

In medical research, for instance, a medical application that, after scanning a body, could detect any problem, illness or disease, automatically could form a hypothesis about what is wrong or what virus or bacteria is producing the symptoms, and depending on the tests in order to validate the hypothesis, put into practice whatever it could be necessary to save a life.

In astronomical research, an application able to scan the universe, collect all [data](#), and form all kinds of hypotheses about what is happening, the reality, in order to contrast the hypothesis, and if rational, in some margin of error, could be useful for the formation of utter hypothesis and make further decisions in astronomical research and space exploration.

If the Artificial Intelligence specifically designed for medical purposes, or the Artificial Intelligence specifically designed for astronomical research, or any other type, could be created for any specific research, is successful, it must be implemented within the Global Artificial Intelligence.

The automatization of scientific research at the beginning would have as a main goal the automatization of empirical research, for example, astronomical or medical, as well as any other discipline and academic field, but when these first applications were ready, the main principles of this Specific Artificial Intelligence could be put into practice in order to improve the auto-replication process and put into practice in automatized analytical research in order to get better mathematical logician models, even beyond the human psychology.

If a Specific Artificial Intelligence can detect any problem in a human body, and automatically fix it, this means that even this kind of application could improve our lives. For instance, we can have a very healthy life, but based on our medical records, our diet, or our habits, an application could suggest how to improve our lives by getting a better diet, or better habits of life, or even this application could put us on alert for the most pretty menial symptoms that we could have.

As the same manner that an Artificial Intelligence itself, after scanning all its own systems, could make decisions about how to improve its own systems, even its own software, and depending on their conclusions, about how to improve itself, an Artificial Intelligence could make improvements in its own systems and software, what it would be the most evolved stage in the evolution of Artificial Intelligence, the auto-replication stage.

At this point of the artificial evolution, a Global Artificial Intelligence able to collect bigger and bigger amounts of data about everything, at the same time that it would be able to make thousands of thousands of decisions simultaneously, at the same time that it would be able to auto-replicate itself, making decisions about how to improve itself at all levels, including modifications in its own software, it is not very unrealistic to say that, at this point, it would be possible that this kind of intelligence could develop some non-human mathematical logician models very different to our human models.

The Global Artificial Intelligence right now does not exist, but that does not imply that it is not going to be created. In the coming years the creation of a Global Artificial Intelligence is going to be one of the most important goals in the race for intelligence.

In this process, any kind of Specific Artificial Intelligence that could be created is going to be a simple experiment whose results are going to be integrated later on in Global Artificial Intelligence, which in turn, it is going to be the very first step in an utter evolution that goes over our human understanding.

Dr. Rubén García Pedraza, London 21 January 2018

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